

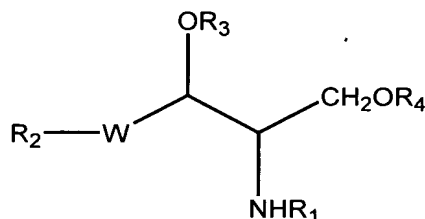
Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claims 1-29 (Cancelled)

30. (New) A compound of formula (I):



wherein

**R<sub>1</sub>** represents a hydrogen, a branched or linear alkyl, aryl, alkylamine, or a group -C(O)R<sub>5</sub>;

**R<sub>2</sub>** and **R<sub>5</sub>** represent, independently, a branched or linear C<sub>10</sub>-C<sub>24</sub> alkyl, alkenyl or polyenyl groups;

**R<sub>3</sub>** and **R<sub>4</sub>** are independently a group -C(O)-NR<sub>6</sub> R<sub>7</sub>, **R<sub>6</sub>** and **R<sub>7</sub>** being the same or different for R<sub>3</sub> and R<sub>4</sub> and represent, independently, a hydrogen, or a saturated or unsaturated branched or linear polyalkylamine, wherein one or more amine

units in said polyalkylamine may be a quaternary ammonium; or  $R_3$  is a hydrogen; or

$R_3$  and  $R_4$  form together with the oxygen atoms to which they are bound a heterocyclic ring comprising  $-C(O)-NR_9-[R_8-NR_9]_m-C(O)-$ ,  $R_8$  represents a saturated or unsaturated  $C_1-C_4$  alkyl and  $R_9$  represents a hydrogen or a polyalkylamine of the formula  $-[R_8-NR_9]_n-$ , wherein said  $R_9$  or each alkylamine unit  $R_8NR_9$  may be the same or different in said polyalkylamine; and

$n$  and  $m$ , represent independently an integer from 1 to 10;

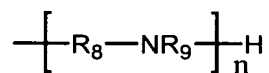
$W$  represents a group selected from  $-CH=CH-$ ,  $-CH_2-CH(OH)-$  or  $-CH_2-CH_2-$ .

31. (New) The compound of Claim 30, wherein  $R_1$  represents a  $-C(O)R_5$  group,  $R_5$  being as defined.

32. (New) The compound of Claim 30, wherein said  $R_2$  and  $R_5$  represent, independently, a linear or branched  $C_{12}-C_{18}$  alkyl or alkenyl groups.

33. (New) The compound of Claim 30, wherein  $W$  represents  $-CH=CH-$ .

34. (New) The compound of Claim 30, wherein **R<sub>1</sub>** represents a -C(O)**R<sub>5</sub>** group; **R<sub>5</sub>** represents a C<sub>12</sub>-C<sub>18</sub> linear or branched alkyl or alkenyl; **W** represents -CH=CH-; **R<sub>2</sub>** represents a C<sub>12</sub>-C<sub>18</sub> linear or branched alkyl or alkenyl; **R<sub>3</sub>** and **R<sub>4</sub>** represent, independently, a group C(O)-NR<sub>6</sub>R<sub>7</sub>, and **R<sub>3</sub>** may also represent a hydrogen, wherein **R<sub>6</sub>** and **R<sub>7</sub>** represent, independently, a hydrogen or a polyalkylamine having the general formula (II):



wherein

**R<sub>8</sub>** represent a C<sub>1</sub>-C<sub>4</sub> alkyl;

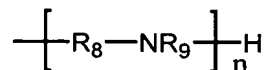
**R<sub>9</sub>** represents a hydrogen or a polyalkylamine branch of formula (II), said **R<sub>8</sub>** and **R<sub>9</sub>** may be the same or different for each alkylamine unit, -**R<sub>8</sub>**NR<sub>9</sub>-, in the polyalkylamine of formula (II); and

**n** represents an integer from 3 to 6.

35. (New) The compound of Claim 34, wherein **R<sub>3</sub>** is a hydrogen atom.

36. (New) The compound of Claim 30, wherein **R<sub>1</sub>** represents a -C(O)**R<sub>5</sub>** group; **R<sub>5</sub>** represents a C<sub>12</sub>-C<sub>18</sub> linear or branched alkyl or alkenyl; **W** represents -CH=CH-; **R<sub>2</sub>** represents a C<sub>12</sub>-C<sub>18</sub> linear or branched alkyl or alkenyl; **R<sub>3</sub>** and **R<sub>4</sub>** represent independently a group C(O)-NR<sub>6</sub>R<sub>7</sub>, wherein **R<sub>6</sub>** and **R<sub>7</sub>** represent,

independently, an alkylamine or a polyalkylamine having the general formula (II):



wherein

**R<sub>8</sub>** represent a C<sub>1</sub>-C<sub>4</sub> alkyl;

**R<sub>9</sub>** represents a hydrogen or a polyalkylamine branch of formula (II), said **R<sub>8</sub>** and **R<sub>9</sub>** may be the same or different for each alkylamine unit, -**R<sub>8</sub>****NR<sub>9</sub>**-, in the polyalkylamine of formula (II); and

**n** represents an integer from 3 to 6.

37. (New) The compound of Claim 30, wherein **R<sub>1</sub>** represents a C(O)**R<sub>5</sub>** group; **R<sub>5</sub>** represents a C<sub>12</sub>-C<sub>18</sub> linear or branched alkyl or alkenyl; **W** represents -CH=CH-; **R<sub>2</sub>** represents a C<sub>12</sub>-C<sub>18</sub> linear or branched alkyl or alkenyl; **R<sub>3</sub>** and **R<sub>4</sub>** form together with the oxygen atoms to which they are bonded a heterocyclic ring comprising -C(O)-[NH-**R<sub>8</sub>**]<sub>n</sub>-NH-C(O)-,

wherein

**R<sub>8</sub>** represents a C<sub>1</sub>-C<sub>4</sub> alkyl, wherein for each alkylamine unit having the formula -NH-**R<sub>8</sub>**-, said **R<sub>8</sub>** may be the same or different; and

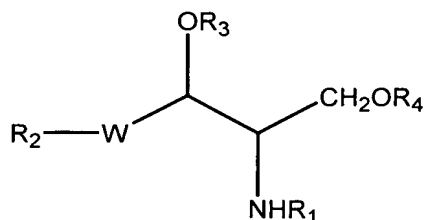
**n** represents an integer from 3 to 6.

38. (New) The compound of Claim 30, wherein said  $R_8$  is a  $C_3$ - $C_4$  alkyl.

39. (New) The compound of Claim 30, being N-palmitoyl D-erythro sphingosyl-1-carbamoyl spermine.

40. (New) The compound of Claim 30, having the chemical structure as depicted in Fig. 2C.

41. (New) A process for the preparation of a sphingoid-polyalkylamine conjugate of formula (I)



wherein

$R_1$  represents a hydrogen, a branched or linear alkyl, aryl, alkylamine, or a group  $-C(O)R_5$ ;

$R_2$  and  $R_5$  represent, independently, a branched or linear  $C_{10}$ - $C_{24}$  alkyl, alkenyl or polyenyl groups;

$R_3$  and  $R_4$  are independently a group  $-C(O)-NR_6$ ,  $R_7$ ,  $R_6$  and  $R_7$  being the same or different for  $R_3$  and  $R_4$  and represent, independently, a hydrogen, or a saturated or unsaturated

branched or linear polyalkylamine, wherein one or more amine units in said polyalkylamine may be a quaternary ammonium; or

$R_3$  represents a hydrogen; or

$R_3$  and  $R_4$  form together with the oxygen atoms to which they are bound a heterocyclic ring comprising  $-C(O)-NR_9-[R_8-NR_9]_m-C(O)-$ ,  $R_8$  represents a saturated or unsaturated  $C_1-C_4$  alkyl and  $R_9$  represents a hydrogen or a polyalkylamine of the formula  $-[R_8-NR_9]_n-$ , wherein said  $R_9$  or each alkylamine unit  $R_8NR_9$  may be the same or different in said polyalkylamine; and

$n$  and  $m$  represent independently an integer from 1 to 10;

$W$  represents a group selected from  $-CH=CH-$ ,  $-CH_2-$ ,  $CH(OH)-$  or  $-CH_2-CH_2-$ ;

the process comprises:

(a) providing a sphingoid compound of formula (I) wherein  $R_1$ ,  $R_2$  and  $W$  have the meaning as defined above and  $R_3$  and  $R_4$  represent, independently, a hydrogen atom or an oxo protecting group, wherein at least one of said  $R_3$  and  $R_4$  represent a hydrogen atom;

(b) reacting said compound of step (a) with an activating agent, optionally in the presence of a catalyst, to obtain an activated  $R_3$  and/or  $R_4$  group;

(c) reacting said activated sphingoid compound with a polyalkylamine;

(d) removing said protecting group thereby obtaining said sphingoid-polyalkylamine conjugate of formula (I) as defined above.

42. (New) The process of Claim 41, wherein said sphingoid-polyalkylamine conjugate is N-palmitoyl D-erythro sphingosyl-1-carbamoyl spermine.

43. (New) The process of Claim 41, wherein said protecting group is a primary amine protecting group selected from trifluoroacetamide, fmoc, carbobenzoxy (CBZ), dialkyl Phosphoramidates.

44. (New) The process of Claim 41, wherein said activating agent is selected from N,N'-disuccinimidylcarbonate, di- or tri-phosgene or an imidazole derivative.

45. (New) The process of Claim 41, wherein said activation is performed in the presence of a catalyst, the catalyst being selected from 4-dimethylamino pyridine (DMAP), tetrazole, dicyanoimidazole or diisopropylethylamine.

46. (New) The process of Claim 41, for obtaining a di-substituted sphingoid-polyalkylamine conjugate, wherein

in step (a) both  $R_3$  and  $R_4$  are hydrogen atoms, and said process comprises reacting the compound of formula (I) with at least two equivalents of polyalkylamine to obtain a disubstituted sphingoid-polyalkylamine conjugate, with identical polyalkylamine substituents.

47. (New) The process of Claim 41, for obtaining a di-substituted sphingoid-polyalkylamine conjugate, wherein

in step (a) at least one of  $R_3$  or  $R_4$  is protected with a protecting group, the process comprises reacting in step (c) the activated sphingoid compound with a first polyalkylamine; removing the protecting group of  $R_3$  or  $R_4$  to obtain an unprotected oxo group; reacting the unprotected compound with an activating agent to obtain an activated mono-substituted sphingoid-polyalkylamine conjugate; and reacting said activated mono-substituted sphingoid-polyalkylamine conjugate with a second polyalkylamine, thereby obtaining a di-substituted sphingoid-polyalkylamine conjugate, said first and second polyalkylamine may be the same or different.

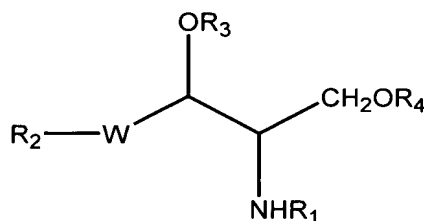
48. (New) The process of Claim 41, for obtaining a heterocyclic sphingoid-polyalkylamine conjugate, wherein

in step (a) both  $R_3$  and  $R_4$  are hydrogen atoms, said sphingoid compound is reacted with at least two equivalents of

an activating agent to obtain an activated sphingoid with both  $R_3$  and  $R_4$  activated and reacting said activated sphingoid compound with less than an equivalent of polyalkylamine, thereby obtaining a heterocyclic sphingoid-polyalkylamine conjugate.

49. (New) The process of Claim 41, for obtaining any one of the sphingoid-polyalkylamine conjugates as depicted in Figs. 1A to 1D.

50. (New) A composition comprising a sphingoid-polyalkylamine conjugate of the formula (I):



wherein

$R_1$  represents a hydrogen, a branched or linear alkyl, aryl, alkylamine, or a group  $\text{-C(O)R}_5$ ;

$R_2$  and  $R_5$  represent, independently, a branched or linear  $\text{C}_{10}\text{-C}_{24}$  alkyl, alkenyl or polyenyl groups;

$R_3$  and  $R_4$  are independently a group  $\text{-C(O)-NR}_6$ ,  $R_7$ ,  $R_6$  and  $R_7$  being the same or different for  $R_3$  and  $R_4$  and represent, independently, a hydrogen, or a saturated or unsaturated

branched or linear polyalkylamine, wherein one or more amine units in said polyalkylamine may be a quaternary ammonium; or

$R_3$  is a hydrogen; or

$R_3$  and  $R_4$  form together with the oxygen atoms to which they are bound a heterocyclic ring comprising  $-C(O)-NR_9-[R_8-NR_9]_m-C(O)-$ ,  $R_8$  represents a saturated or unsaturated  $C_1-C_4$  alkyl and  $R_9$  represents a hydrogen or a polyalkylamine of the formula  $-[R_8-NR_9]_n-$ , wherein said  $R_9$  or each alkylamine unit  $R_8NR_9$  may be the same or different in said polyalkylamine; an

$n$  and  $m$  are independently an integer from 1 to 10;

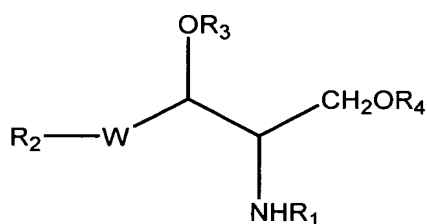
$W$  represents a group selected from  $-CH=CH-$ ,  $-CH_2-CH(OH)-$  or  $-CH_2-CH_2-$ .

51. (New) The composition of Claim 50, further comprising a pharmaceutically acceptable carrier.

52. (New) The composition of Claim 50, wherein said sphingoid-polyalkylamine conjugate is N-palmitoyl D-erythro sphingosyl-1-carbamoyl spermine.

53. (New) The composition of Claim 50, further comprising a biologically active molecule.

54. (New) In the method of capturing a molecule having a negative charge, a negative dipole or a local negative dipole with a conjugate capable of capturing said molecule by electrostatic interaction, the improvement wherein said conjugate is a compound of formula (I):



wherein

**R<sub>1</sub>** represents a hydrogen, a branched or linear alkyl, aryl, alkylamine, or a group -C(O)R<sub>5</sub>;

**R<sub>2</sub>** and **R<sub>5</sub>** represent, independently, a branched or linear C<sub>10</sub>-C<sub>24</sub> alkyl, alkenyl or polyenyl groups;

**R<sub>3</sub>** and **R<sub>4</sub>** are independently a group -C(O)-NR<sub>6</sub>R<sub>7</sub>, **R<sub>6</sub>** and **R<sub>7</sub>** being the same or different for **R<sub>3</sub>** and **R<sub>4</sub>** and represent, independently, a hydrogen, or a saturated or unsaturated branched or linear polyalkylamine, wherein one or more amine units in said polyalkylamine may be a quaternary ammonium; or

**R<sub>3</sub>** is a hydrogen; or

**R<sub>3</sub>** and **R<sub>4</sub>** form together with the oxygen atoms to which they are bound a heterocyclic ring comprising -C(O)-NR<sub>9</sub>-(R<sub>8</sub>-NR<sub>9</sub>)<sub>m</sub>-C(O)-, **R<sub>8</sub>** represents a saturated or unsaturated C<sub>1</sub>-C<sub>4</sub> alkyl and **R<sub>9</sub>** represents a hydrogen or a polyalkylamine of the formula

$-[R_8-NR_9]_n-$ , wherein said  $R_9$  or each alkylamine unit  $R_8NR_9$  may be the same or different in said polyalkylamine; and  $n$  and  $m$  are independently an integer from 1 to 10;

**W** represents a group selected from  $-CH=CH-$ ,  $-CH_2-$ ,  $CH(OH)-$  or  $-CH_2-CH_2-$ .

55. (New) The use of Claim 54, wherein said compound is N-palmitoyl D-erythro sphingosyl-1-carbamoyl spermine.

56. (New) A kit comprising a compound according to Claim 30 and instructions for use of said compound as a capturing agent.

57. (New) The method of Claim 56, wherein said compound is N-palmitoyl D-erythro sphingosyl-1-carbamoyl spermine.

58. (New) The compound of Claim 30, wherein **R<sub>1</sub>** represents a  $-C(O)R_5$  group; **R<sub>5</sub>** represents a  $C_{12}-C_{18}$  linear or branched alkyl or alkenyl; **W** represents  $-CH=CH-$ ; **R<sub>2</sub>** represents a  $C_{12}-C_{18}$  linear or branched alkyl or alkenyl; **R<sub>3</sub>** and **R<sub>4</sub>** are independently a group  $-C(O)-NR_6R_7$ , **R<sub>6</sub>** and **R<sub>7</sub>** being the same or different for  $R_3$  and  $R_4$  and represent, independently, a hydrogen, or a saturated or unsaturated branched or linear polyalkylamine,

\* " In re of: BARENHOLZ 15

wherein one or more amine units in said polyalkylamine may be a quaternary ammonium; or  $R_3$  is a hydrogen.